



Circuit Court of the United States

FOR THE

SOUTHERN DISTRICT OF NEW YORK.

THE AMERICAN BELL TELEPHONE COMPANY, ET AL.,

against

THE PEOPLE'S TELEPHONE COMPANY, ET AL.

IN EQUITY.

OPINION,

WALLACE, J.

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13 April 1879 - McElroy
This suit is brought to enjoin the defendants from using and furnishing to others for use the several inventions described in two patents granted to Alexander Graham Bell, of Salem, Massachusetts, being No. 174,465, bearing date March 7, 1876, for "Improvements in Telegraphy," and No. 186,787, bearing date Jan. 30, 1877, for "Improvements in Electric Telephony." The issues made by the pleadings are practically resolved into the single question, to which the proofs and arguments of counsel are mainly addressed, whether the patentee Bell, or Daniel Drawbaugh, of Milltown, in Cumberland County, Pennsylvania, was the first inventor of the electric speaking telephone.

Concededly Bell was an original inventor of the telephone, the principle of which with the essential means for its application, are described in his first patent, and of the improved apparatus described in his second patent. The fifth claim of the first patent is for "the method of and apparatus for transmitting vocal or other sounds telegraphically, as herein described, by causing electrical undulations, similar in form to the vibrations of the air accompanying the said vocal or other sounds substantially as set forth." This patent has been judicially construed in two cases in the Massachusetts Circuit; and in both cases it was substantially held that Bell was the discoverer of the new art of transmitting speech by electricity, and that the claim should receive the broadest interpretation to secure to the inventor not the abstract right of sending sounds by telegraph

without regard to means, but all means and processes described which are essential to the application of the principle. *American Bell Telephone Co. vs. Spencer*, 8 Fed. Rep., 509. *Same v. Dolbear*, 5 Fed. Rep., 448.

In view of the conclusion reached upon the merits of the issue, it is not material whether Bell's inceptive invention did or did not antedate the time of filing his application for the first patent. That application was filed Feb. 14, 1876. It describes apparatus which was an articulating telephone, whether Bell knew it or not. Mr. Cross, an expert, caused apparatus to be made in conformity to the description and to drawings as shown in Figure 7 of the patent, which proved itself to be an operative, practical telephone. Probably the date of his inceptive invention might be carried back to July, 1875, but, irrespective of the time of the invention, the justice of his claim to be an original inventor of the telephone must remain unchallenged. It was through him also that the telephone was made known to the scientific public, and thence introduced into commercial use.

The defendants contend that, long before Bell had perfected his invention, and long before its mental conception by him, Drawbaugh had not only made the same invention, but had perfected improvements in organization and detail which Bell never reached, and which were only reached years afterwards by the work of many other inventors in the same field of improvement. Their theory of the facts is stated with substantial accuracy in the answer to the bill of complaint. The answer, among other things, avers that Drawbaugh "was and is the original and first inventor and discoverer of "the art of communicating articulate speech between distant places "by voltaic and magneto electricity, and of the construction and operation of machines and instruments for carrying such art into practice; . . . that the said electric speaking telephones so constructed "and successfully and practically used by him contained all the material and substantial parts and inventions patented" in the two patents granted to Bell; and also contained other important and valuable inventions in electric and magneto telegraphy; . . . "that some "of the original machines and instruments invented, made, used and "exhibited to many others long prior to the alleged inventions of Bell "are still in existence, and capable of successful practical operation

"and use, and are identified by a large number of persons who personally tested and used and know of their practical operation and use in the years 1870, 1871, 1872, 1873, 1874, and both subsequently and prior thereto; . . . that said Drawbaugh for more than ten years prior to 1880 was miserably poor, in debt, with a large and helpless family dependent upon his daily labor for support, and was from such cause alone utterly unable to patent his said invention or caveat it, or manufacture and introduce it upon the market; and that said Drawbaugh never abandoned nor acknowledged the claims of any other person thereto, but always persisted in his claim to it, and intended to patent it as soon as he could obtain the necessary pecuniary means therefor."

Drawbaugh, in his testimony, adopts the statements of the answer as true. He also testifies that he commenced his experiments with the electric telephone as early as 1866; that prior to or as early as in 1867 he had made apparatus (in which he employed a teacup as the transmitter) through which speech could be transmitted feebly and incoherently; and that as early as the time of the birth of his son Charles he had so progressed that his wife, who was then confined to her bed, could, by listening with one of his instruments, hear the words spoken by him in the other instrument in a distant part of the house. His son Charles was born in 1870, and, if Drawbaugh's narrative is true, he had succeeded at that time in transmitting speech distinctly through the instruments, although whispered words would not be accurately heard. He describes instruments which, he says, were made by him from time to time, as experiments which led him from one movement to another. He testifies that he thinks he made his first telephone apparatus prior to November, 1866, and is positive he had it before he moved his shop to the "Clover-Mill," in 1867.

As he describes it, the body of the transmitter was a porcelain teacup, the diaphragm was of membrane, the electrodes interposed in the circuit were two copper disks, the upper one of which was connected to the diaphragm by a wire, so as to vary its pressure upon a low conductor of fine earth or pulverized charcoal interposed between the disks through the action of the sound waves upon the diaphragm; and the receiver was a tin can without a top or bottom, having a membrane diaphragm stretched over one end, connected by a tense cord

to an armature supported on a spring, and arranged close to the poles of an electro magnet in the electric circuit. He testifies that subsequently he constructed apparatus upon the same general principle, with some change of detail; and he produces Exhibits "F" and "B,"—the former a transmitter and the latter a receiver—as the remnants of the original instruments. Exhibit "F" is a glass tumbler; and he states that at first he used a membrane diaphragm over it, and then one of thin metal; and that for the conductor he used pulverized carbon or carbon mixed with bronze powder, and used various tops or mouthpieces to speak into it. The Exhibit "B," he says, was the receiver; and in this he had discarded the string and the spring of his earlier receiver. He says that experiment led him to improve the transmitter "F" by substituting a metal diaphragm in place of membrane, and he produces a sketch. A reproduction of this instrument has been made by him for use in the proofs, which is designated as "Exhibit F reproduced." In this the mouthpiece is modified in size and in distance from the diaphragm.

He made, according to his testimony, a new receiver of more perfect construction, and produces the remnant of the original, which is designated as "Exhibit C." As he describes the instrument, it was a decided advance upon the former receiver. In using this, he says he tested it also as a transmitter with some success, and then improved it by placing a permanent magnet against the heel of the electro-magnet, and thus made a magneto telephone. A reproduction of such an instrument as he describes is made and referred to in the proofs as "Exhibit Reproduced C." After Exhibit "C," he produces Exhibits "I," "A," "E" and "D," as likewise original instruments, made respectively in the chronological order of their production as exhibits. He states that "I" was used by him as a companion instrument to "C." Exhibit "A" discloses a modification of form and a higher degree of mechanical adaptation.

The last two, "D" and "E," are concededly perfect, practical instruments; and, according to the testimony of Mr. Benjamin, an expert witness for the defendants, would compete successfully for public patronage with any magneto telephone which had been introduced into use in 1882. It is asserted of these instruments by counsel that no higher development of the magneto telephone has been reached at

the present time than is indicated by Exhibits "E" and "D." Drawbaugh does not attempt to fix the time at which he made any of these instruments, or even the year. He testifies, however, that he made all of them prior to the time the "Axle Company" commenced business, which was in December, 1874, except "E" and "D," which were made about that time.

The theory of the defendants is, that Exhibits "F" and "B" were used by Drawbaugh in 1867, 1868 and 1869, Exhibit "C" in 1869 and 1870, Exhibit "I" in 1870 and 1871, Exhibit "A" in 1873 and 1874; and that Exhibits "E" and "D" were made in January, or February, 1875, although cruder instruments essentially similar were made somewhat earlier. It is in proof that thirty-three patents were granted for improvements in telephones in 1878, sixty-four in 1879, more than one hundred in 1880, and ninety-four in the first six months of 1881. According to the theory of the defendants, therefore, as early as February, 1875, Drawbaugh had not only distanced Bell in the race of invention, but also Gray and Edison, and had accomplished practically all that has since been done by a host of other inventors.

The case for the defendants must stand or fall by this theory. The proofs leave no room for fair doubt that defendants' contention is substantially true, or that the defence has no foundation in fact. It is either true that Drawbaugh had long been treading his solitary path of investigation and experiment in poverty and obscurity, but had perfected his work when the inventions of other explorers were in embryo, or his story is an ingenious fabrication. And, as will hereafter appear, if the defence is a fabrication, many disinterested witnesses have contributed innocently to give it color and strength; but Drawbaugh has deliberately falsified the facts.

The complainant starts with the benefit of the presumption of law that Bell, the patentee, was the inventor of that for which the Letters Patent were granted him. Whoever alleges the contrary must assume the burden of proof. Evidence of doubtful probative force will not overthrow the presumption of novelty and originality arising from the grant of Letters Patent for an invention.

It has been frequently held that the defence of want of novelty or originality must be made out by proof so clear and satisfactory as to

remove all reasonable doubt. *Washburn v. Gould*, 3 Story, 227; *Smith v. Fay*, 6 Fish, 446; *Hawes v. Antisel*, 2 B. & A., 10; *Patterson v. Duffy*, 20 Fed. Rep., 641; *Wood v. Cleveland Rolling Mill Co.*, 4 Fish, 560; *Parham v. American Button Hole Co.*, Do. 482. In *U. S. Stamping Co. v. Jarrett*, 18 Blatch. 469, Blatchford, J., said the defendant had not fulfilled "the necessary obligation of showing beyond any reasonable doubt" that Weber (the alleged prior inventor) was prior to Heath (the patentee). In *Coffin v. Ogden*, 18 Wall. 129, Mr. Justice Swayne delivering the opinion of the Court stated the rule applicable to the defendant as follows: "The burden of proof rests upon him, and every reasonable doubt should be resolved against him."

To overthrow this presumption and disprove that Bell was the first inventor, the defendants introduce the testimony of nearly two hundred witnesses tending to prove the priority of invention by Drawbaugh. As the complainant concedes that Exhibits "E" and "D" are highly organized, practical telephone instruments, and fully capable of perfect articulation, the patents are invalidated if these instruments were in existence at the date of Bell's invention; and, as will hereafter appear, either they were in existence as early as in 1875, or it is incredible that they existed at all until long after Bell's first patent had been granted, and his invention had attracted general public attention at the Centennial Exposition and elsewhere.

In the argument for the defendants, great stress is placed upon the evidence of a gradual and natural development of Drawbaugh's invention shown by the original instruments produced, beginning with Exhibit "B," and ending with the perfect magnetos "E" and "D."

It is strenuously urged that these exhibits fortify his testimony describing the instruments no longer extant, and mark the origin and culmination, beginning with the cup machine and Exhibit "F" of two separate lines of invention; one leading to the battery telephone, in which the undulatory vibrations are controlled by variations in the resistance of the circuit; and the other to the magneto telephone, in which the vibrations are created in the act of producing the current itself.

The general theory of the defence is substantiated by three classes of witnesses; those who heard of the existence of Draw-

baugh's "talking machines" at various times; those who talked through the machines on various occasions, or heard others talk through them; and those who attempt to identify one or more of the exhibits as the instruments they saw used. Only an outline of their testimony will be given.

More than fifty witnesses testify to having heard of the talking machines prior to Feb. 14, 1879.

Of these witnesses, three think they heard of them in 1869; three in 1870; two in 1871; five in 1872; three in 1873; three prior to 1873; eight in 1874; two in 1875; from 1866 to 1876 one; from 1868 to 1871 one; from 1868 to 1873 one; from 1869 to 1870 one; from 1869 to 1876 one; from 1871 to 1872 two; from 1872 to 1873 one; from 1873 to 1874 one; from 1873 to 1875 three; from 1874 to 1875 one; from 1874 to 1876 one; from 1872 to 1876 one; prior to 1869 one; prior to 1872 two; prior to 1875 one.

Sixty witnesses do not attempt to identify any particular instrument, but testify that they saw a talking machine or talked through it, or heard it talked through at Drawbaugh's shop on occasions subsequent to 1867, and most of them fix the occasion as prior to 1876. The substance of the testimony of some of them will be given.

Wilson G. Fox testified that he saw the talking machine at Mr. Drawbaugh's shop about the year 1867 or 1868, when the old Faucet Company was in operation there. Prior to March, 1871, the witness was employed in the carding room of the Harrisburg Cotton Mill, and Drawbaugh came there to get material to wrap his wire to use for the talking machine. Henry Bonholtzer testified that he was at Drawbaugh's shop in 1869, and saw talking machines there. Margaret Brenneman testified that she saw the talking machines at Drawbaugh's shop in 1869. Abraham May testified that he did work on Daniel Hart's house at Milltown in August and September, 1870, of which he produces his account books; that he never did any work for Daniel Hart after that; that while doing that work he was at Drawbaugh's shop to get a boring machine mended, which he was using in the work, and Drawbaugh showed him his talking machines, and talked through them from one floor of the shop to another. The witness understood and heard through the machine the words that Mr. Drawbaugh spoke into it. His testimony is corroborated by Jacob H. Kilmore, William H. Martin, and John A. Smith.

Cyrus Orris testified that he saw Drawbaugh's talking machines at different times, from about the 1st of April, 1871, down to 1880, and took his son-in-law, Jacob E. Smith, to Drawbaugh's shop to see the machines about April 1, 1871. Benjamin K. Goodyear testified that in 1871 he seized the personal property of George W. Kissinger, of Milltown, upon an execution issued Nov. 13, 1871; that on Dec. 4, 1871, the attached property was appraised, and on that day witness went to the workshop of Daniel Drawbaugh to find J. B. Drawbaugh, to summon him as an appraiser, and had to wait for him there a short time; that while waiting there Daniel Drawbaugh showed him his talking machines, and talked through them to him, and witness heard him speak, and understood distinctly the words that he spoke through the instrument; and that he was never in Drawbaugh's shop afterwards, so far as he can recollect.

George Natcher testifies that he lived at Milltown in 1871, 1872, and never has been in the town since Aug. 9, 1872; that while living there he was at Drawbaugh's shop, and saw and talked through the talking machines on different floors, and listened at the same machine and understood what was said through it. Mrs. B. B. Spangler, a sister of George Natcher, testifies that she moved away from Milltown in 1872, and never has been there since; that she talked into Drawbaugh's talking machines while she lived there; and that she was so small that Harman Drawbaugh had to lift her up to enable her to talk into the machine. Mrs. Mary Free testifies that she was with her sister, Mrs. Lydia Drawbaugh, at Drawbaugh's shop in September, 1872, when he talked through the machines to them, and she remembers hearing through the machines, "Good afternoon, ladies!" Drawbaugh told them that the machines operated by electricity.

Mrs. Lydia Drawbaugh testifies that she saw the talking machines in September, 1872, her sister, Mrs. George Free, being present. David M. Ditlow testifies that he saw Drawbaugh's talking machines about 1872, when Drawbaugh talked through it, and witness heard and understood through the machine what he said. David K. Ernest testifies that he was at Drawbaugh's shop with John B. Bloser about the middle of June, 1872, and talked with Drawbaugh about the talking machines, and thinks he saw them at that time. This testimony is corroborated by John Bloser. N. W. Kahney

testifies that he saw the talking machines about 1872. William H. Martin testified that he was at Milltown with John Keefauver, to get George Hosler to make him a pair of boots. Hosler lived at Milltown only from March, 1872 to March, 1873. At that time witness and Mr. Keefauver went down to Drawbaugh's shop, and talked through the talking machine, from the basement to the attic, and heard and understood what was said through the machines. They talked and listened at the same instrument.

John F. Keefauver corroborates Mr. Martin, and also states that he talked through Drawbaugh's talking machine with Jacob M. Sadler, in April, 1873, prior to the death of George B. Hick, and that about two or three years before he saw the talking machines he had heard a good deal about them, and first heard of them at a place seven miles west of Carlisle. Wm. W. Snyder testifies that he was at Drawbaugh's shop, on Wednesday, Feb. 5, 1873, and saw the talking machines. He verifies the date by an entry in his diary. Jacob Barber testifies that he was a candidate for the office of County Commissioner of Cumberland County in the summer of 1873, and, in connection with his canvass went to Drawbaugh's shortly after the death of George B. Hick. While at Drawbaugh's shop he saw the talking machine, and was never in the shop after July or August 1873.

Ezekiel Worley testifies that about the year 1873, he saw the talking machines at Drawbaugh's shop. His statement is corroborated by John K. Taylor. Abraham Ditlow testifies that he knew of Drawbaugh's talking machine in 1874, and saw it and talked through it at that time. He had forgotten the fact, but was reminded of it by Mr. Alexander Milner, of Porter County, Ind., whom witness told about it in May or June, 1876, in Indiana. William Eppley testifies that he visited Drawbaugh's shop for the last time in May or June, 1875; that he was there several times during the two years preceding that period, and had seen talking machines. Jonathan Fry testifies that he was at Drawbaugh's shop with Mr. Hamme and Mr. Frederick in the winter of 1875-6, and saw the talking machines there. Jacob Evans testifies that he was at Drawbaugh's shop with his wife, his brother Andrew, and his sisters Margaret and Sarah,

about Dec. 1, 1875, and saw and talked through the talking machines.

Henry L. Hamme testifies that he was at Drawbaugh's shop either in the last of January or the beginning of February, 1876, in company with George Frederick and Jonathan Fry, and saw and talked through the talking machine at the time; that he heard and understood very plainly what was said through the machines, even when Mr. Drawbaugh talked in a whisper. George Frederick testifies that he was at Drawbaugh's shop with Mr. Hamme and Mr. Fry in January or February, 1876, and saw the talking machine. S. S. Rupp testifies that he was at Drawbaugh's shop with Mr. Hammacher and his scholars on Feb. 1, 1876, and recollects that Mr. Drawbaugh at that time spoke about a machine that he had which he called a talking machine, but the witness was interested in other things and did not pay much attention to it. George H. Bowman testifies that he saw talking machines in Drawbaugh's shop in February, 1876, at which time somebody was talking to Mr. Drawbaugh through them. Charles L. Drawbaugh testifies that he saw and talked through the talking machines at Drawbaugh's shop a year or more prior to May 1, 1876, and heard and understood what was said.

The third class of witnesses are those who identify more or less positively one or more of the several exhibits as the instruments used by them, or which they saw used by others prior to March 7, 1876. Exhibits "F" and "B" are identified by the following witnesses: Brooks saw them in 1874; Smyser, in 1872; Eberly, before December, 1870; Wagner, in the fall of 1874; Freese, in 1869 or 1870; Yetter, about Christmas, 1875; Fry, spring of 1875; Carl, in 1870; Scherick, in 1869; Balsley, between 1870 and 1874; Good, before 1872; Kahney, in 1871 or 1872; Schettel, about 1872; Nichols, in 1875; Renneher, in May, 1875; Weber, late in 1874; Stephen, before 1875; Shireman, about 1872; Hawn, about 1872; H. B. Eberly, in May, 1873; J. C. Smith, between April, 1872 and April, 1873; Sternberger, in October, 1871; Fettrow, in April, 1876; Halsinger, prior to 1876; Shoop, in 1869; H. F. Drawbaugh, in 1872; Zimmerman, in 1871; Bates, in 1874; Guistweit, in July, 1870; Hale, in fall of 1873; Stone, in June, 1871; Free, in June,

1872; J. A. Oyster in June, 1875; Harmon K. Drawbaugh, in January, 1871; J. B. Drawbaugh, in 1869; G. W. Drawbaugh, in 1870; Lenseman, in July, 1871; Fisher, in 1868 or 1869; Hubler, in fall of 1873; Updegraff, in 1874; W. H. Decker, in 1873; and a number of other witnesses saw one of these two exhibits.

The identification of Exhibits "C," "I" and "A" is made by a smaller number of witnesses. Some of them think they saw "C" in 1870, and others at various dates after that and as late as March 1876.

One of the witnesses thinks he saw "I" in 1871, the others locate the occasions in 1873, 1874 and 1875. Some of the witnesses think they saw "A" as early as 1872, one of them in 1870; but most of them saw it, they think, in 1875.

Exhibits "E" and "D" resemble each other very closely in appearance, and most of the witnesses produced to identify them saw both at the same time. They locate the time as follows: Fry, laborer, in May or June, 1875; Fry, farmer, in April, 1875; Bayler, in June, 1873 (Exhibit "D"); Springer, after April, 1876; Shettel, about 1875; Shoop, after February, 1877; Musser, in June, 1876 (Exhibit "D"); Millard, in 1875; Holsinger, in summer of 1875; Shoop, in 1874 or 1875; Bates, between 1874 and 1877; Dellenger, in March, 1876 (Exhibit "E"); Guistweit, between 1870 and 1876; Bowen, in September, 1878; Hale, in fall of 1875 (Exhibit "D"); Michael Dillinger in November, 1877 (Exhibit "D"); Harmon K. Drawbaugh, in January, 1875, and helped put up wire for them; J. B. Drawbaugh, prior to Jan. 26, 1875; George W. Drawbaugh identifies all the exhibits as seen by him some time between 1871 and 1878; Updegraff and Musser, in 1876; Smith, in 1872 or 1876 (Exhibit "E"); May, in 1876 (Exhibit "D"); J. H. Smith, in May, 1876 (Exhibit "D"); Decker, in 1874 (Exhibit "D"); Vannasdale, in February, 1875; Evans, in fall of 1875; Mrs. Erb, in fall of 1875; S. E. Evans, in fall of 1875 (Exhibit "D"); M. E. Evans, in fall of 1875 (Exhibit "D").

Some of the witnesses who identify exhibits identify the whole series. Other witnesses besides those named identify one or more of the exhibits as seen by them at times subsequent to the date of Bell's application for his patent. Some of the witnesses who identify one or more of the instruments exhibited to them by Drawbaugh as the Exhibits "F," "B" or "C" saw or used them in 1875 or 1876.

Among these are the following, to whose testimony a reference will be made :—

Mr. Springer testifies that he repeatedly talked and listened with Drawbaugh through the instruments after the 1st of April, 1876, using Exhibits "F" and "B" as the instruments. Mr. Musser testifies that he talked through "F" and "B" in June, 1874; but the proofs show that this occasion was as late as in the summer of 1876. Mr. Moore, who is produced to show that Drawbaugh applied to him to acquire an interest in the invention, testifies that the talking machine which Drawbaugh produced was Exhibit "B." This was in May, 1875. Mr. Bayler testifies that he talked through "F" and "B" in 1873; but the proofs show that the occasion was between 1875 and 1877. Mr. Nichols locates the middle of January, 1875, as the time when he saw Exhibit "B" in use.

That the talking machines referred to by the witnesses were electric instruments is clearly established. Drawbaugh testifies explicitly that they were always used with a closed circuit, and without breaking the current, some of them being battery telephones, and some magneto telephones. He always represented them as actuated by electricity to those to whom he explained or described them, and claimed his invention would supersede the telegraph. His assertions show them to have been electrical instruments.

He stated to the witness Shank "it was the greatest invention ever known. If he had the means to go on with it, they could talk, or rather be a time to come as to talk, to the old country, same as we can talk here." To Zacharias, that "he could run it out for miles, and parties could talk in at one end and be heard at the other end, the same as persons in a room together." To Smith, that "parties between Harrisburg and Philadelphia could communicate as if they were speaking together; there would hardly be any limits;" it was an "instrument to convey the voice, to supply the place of the telegraph;" to Smyser, that it would work "from here to California;" to Fry, that one "can talk as far as the wire goes;" to Carl, that "he could hear a man talk from that place to New Cumberland or Harrisburg, and understand distinctly what he said;" to Sherwick, that it was "better and handier than the telegraph; that you could just talk through it in place of writing;" to Balsley, that "by

attaching two wires you can hear it away off; the telegraph is nowhere with it;" to Kahney, that "he could talk the same for miles as he could for a short distance;" to Shettel, that, "if he had a wire from the shop in connection with the telegraph wires at White Hill, he could talk to Mechanicsburg by having a machine there or an instrument in the office; that it would be better than telegraphing, and that it would be worth a great deal of money;" to Reneker, that "he thought he could make it that he could talk through to Harrisburg; he thought they would take the place of telegraphing;" to Weber, that "it beats all the others of my inventions; he could carry sound, or rather talk, as far as Shiremanstown;" to Hawn, that "he would be able to operate that a man preaching in New York, that a congregation in Philadelphia would hear the same sermon;" to Kahney, that "he could just as easy speak ten miles as one, or any distance he would choose to;" to Rupp, who was there with Hamacher, that "it was worked by electricity, would take the place of the telegraph, and that he could make it so that he could talk to San Francisco;" to Musser, that "he was going to make a machine to talk from Harrisburg to Philadelphia, and it would be cheaper and quicker way than telegraphing;" to Smith, that "he believed they could talk for a hundred miles;" to Fettrow, that "I could speak ten, fifteen or twenty miles, or even to California, if there was a wire extended;" to Wisler, that "he could attach a wire to it and talk for ten miles, as far as he could have a circuit around;" to H. F. Drawbaugh, that "he could talk across the continent;" to Free, that "the talking machine could be used to talk at a long distance, — from Philadelphia to California;" to Landis, "that it could be used a thousand miles; it would take the place of the telegraph;" to Lenig, that "he could talk hundreds of miles through that;" to Updegraff, that, "instead of using the old mode of telegraphing, he could talk directly through the wire; he thought he could talk as far as you could use the ordinary telegraph wire;" to Draper, that "he thought it was, or would be, one of the greatest inventions of the age, and would take the place of telegraphing;" to A. Evans, that "he could take this machine and talk clear out to Europe, cross the ocean;" to Eicholz, that "if he could only get some one to help

him once, he would run it to Harrisburg, and convince them, and then he would run it from Harrisburg to Philadelphia."

He stated to the witness Shank, that "it works by electricity;" to Smith, "it was by electricity;" to Nichols, that "the sound was conducted by electricity;" to C. Eberly, that the instruments were "to convey sound by electricity;" to Coudry, that "they were operated by electricity;" to Shoop, that "it operated by a battery;" to Shireman, that "they operated by magnetism;" to Hawn, that "they would be operated on by a battery;" to N. W. Kahney, that "the machine was operated by electricity, by a battery"; to Zimmerman, that "it was electricity that would pass it over the wires; that it would carry the sound right along;" to Hale, that "it was driven by a magnet;" to H. K. Drawbaugh, that "the sound could be carried to a distance on a wire by the use of electricity;" to Lenig, that "electricity was used in connection with it;" to Prof. Heiges, that "in connection with a talking machine both magnetism and electricity were applied;" to Goodyear, that "his talking machine was also done by electricity over wires;" to Woods, that "it was to be an electric machine used in place of telegraphing;" to Young, that "it was an electric talking machine, which he had invented."

Thus Drawbaugh is corroborated by a cloud of witnesses whose testimony tends to substantiate his narrative. Without stopping at this point to consider the credibility and probative force of their testimony, it suffices to state that, although some of the witnesses seem to have been reckless and unscrupulous in their statements, the great body of them are undoubtedly honest witnesses. It is impossible, however, to believe that Drawbaugh can be mistaken in the substance of his testimony, and the conclusion cannot be ignored that either his testimony is true in its essential parts, or his narrative has been manufactured to fit the exigencies of the case. In order to ascertain what effect is to be given to the corroborative proofs, it is important to determine whether Drawbaugh is an honest witness, or whether he has intentionally falsified collateral facts, and is therefore to be deemed discredited.

If the defence is to be believed, he had been experimenting with his talking machine from 1866, and had successfully transmitted speech as early as 1870, if not before that time. He testifies that

he had used Exhibits "B" and "F" in transmitting speech for two or three years before he made Exhibit "C." According to the theory of the defendants' Exhibit "C" was made in 1869 or 1870. At that time he had reached a secondary stage in the development of his invention, and certainly as early as in 1872, when Exhibit "C" had received its latest modifications, the invention had passed out of the period of rudimental forms embodying principle merely, into a form embodying nice details of construction, and had reached a perfection not reached by Bell in his earlier patent. Drawbaugh was well aware of the merit and of the great pecuniary value of the invention; he had obtained patents for several inventions of minor value; yet from 1870 until July 1880, he did not apply for a patent for the telephone.

It was of the first importance to explain the reason of his inaction, because it seems incredible that the inventor of the telephone should not only omit to patent it as soon as he could, but should also remain silent for years after others were winning the fame and profits of the invention. Only one explanation was possible, and that has been attempted. As stated in the answer, and in his testimony, it is that he was unable to do so by reason of his poverty. The answer alleges "that for more than ten years prior to 1880 he was miserably poor, and utterly unable to patent his invention or caveat it." He was asked the question: "Do you mean to have it understood from your last answer, that there was any other reason for some period prior to 1870, except your poverty, whether greater or less, which prevented you from patenting your invention, or filing a caveat for it?" His answer was: "If I understood that right there was no other reason that I can think of now." He proceeds to state that Exhibits "F" and "B" exhibited the principle perfectly enough to patent.

In the elaborate efforts of the defendants to substantiate the theory of Drawbaugh's inability from poverty to patent his invention much testimony has been produced to show, and which does show, that he was always more or less in debt, often a borrower of small sums of money, was dilatory in paying his debts, and used to plead his inability when dunned, and was often sued and judgments and executions were obtained against him; but it is clear from a few plain facts that

the theory of extreme poverty is unfounded, and that Drawbaugh is dishonest in putting it forward. In 1867 and 1869, besides what he received for his wages, he received \$5,000 from the Pump Company for his faucet invention, besides \$1,000 in the stock of the concern. On the first day of April, 1869, he received \$1,000 from one Gardner, for the sale of a half interest in a faucet invention. He invested \$2,000 of the \$5,000 in real estate, lost \$400 of it in an apple speculation, and used the \$1,000 received from Gardner to buy a house and lot for his father. Between 1867 and 1873 he paid \$1,200 to the Drawbaugh Manufacturing Company for assessments on his stock, besides \$870 in labor; and in July, 1873, received from that company \$425 cash in settlement of its affairs.

From 1867 to April, 1872, he was the owner of real estate, for which he had paid \$2,300 in the fall of 1867, and upon which he expended in improvements, in the spring of 1868, from \$300 to \$400, and which was encumbered only by a prior lien for \$300. In the spring of 1872, he encumbered it for \$1,000, not as a principal, but as a surety. He was in receipt of \$110 annually, as rent, for a part of this property, occupying the rest himself, until he sold it in 1876, and bought another house in the town of Mechanicsville. He was always in receipt of fair wages for his labor.

From April 1, 1875, to April 1, 1876, he received nearly \$450 for wages from the Axle Company, irrespective of his earnings from other sources, and declined steady work at times, because he could make more by job work. Thus it appears, that although at times it was not convenient for him to pay his debts, or he was careless or indifferent, he had not only the means of raising money during all this period, but that on many occasions he had means for investment and for speculation. The pretence that he could not raise the fees to caveat or patent his invention is transparently absurd.

He was accustomed to prepare specifications of patents, and was a maker of models, and advertised himself as an inventor, designer, and solicitor of patents. During the time he was experimenting on his talking machine, and before he applied for a patent, he found time and materials for experimenting with and making the Giffard injector for steam engines, the autograph telegraph, the magneto dial telegraph, the magneto key, the automatic fire alarm, and the

electric clock. During this period he was a friend of Mr. Weaver, a patent solicitor, who frequently gave him advice and professional assistance, in return for mechanical services rendered by Drawbaugh, and who drew specifications for him for a measuring faucet and for the magnetic clock. If he was not competent himself to make an application for the patent, it cannot be doubted that, with the assistance of Weaver, he could have made a proper application at a trifling outlay, if any, beyond the fees of the office.

Drawbaugh devoted a good deal of time between 1867 and 1878 to the invention and construction of his electric clock; and the time and money expended by him in experimenting and constructing this clock in its various forms, especially those made in 1877-1878, was much more than would have enabled him to patent his talking machine. These clocks were built by him with his own tools and out of his own money, and to build them economically he made a gear-cutting machine, which must have cost him more than it would to patent his telephone. In April, 1878, he received \$500 from the Electric Clock Company for the privilege of using his clock invention.

In order to fortify the theory of Drawbaugh's inability from poverty, to patent his invention, the defendants have attempted, by testimony from him and from others, to show that he was extremely solicitous to patent it, and tried to induce others to furnish the means. Mr. Springer testifies that "his (Drawbaugh's) whole mind appeared to be on his talking machine. He told me that many a night he didn't sleep, just studying how to improve it." After May, 1872, according to the testimony of Jacob Hawn, the talking machine superseded the clock in Drawbaugh's interest. According to Mr. Holsinger, from 1873 to 1876 "he appeared to be crazy on it. I often tried to get information from him on other subjects, and about half a minute's talk would turn him right on the talking machine."

Henry F. Drawbaugh, his brother, testifies: "Every time I was down there, from the summer of 1872 to 1879 or 1880, he was working at it, and talking, and wanted me to go in with him, and furnish means." Mr. Bates says he "was in Drawbaugh's shop eight or ten times between the summer of 1874 and the fall of 1877, and "his general conversation was about the talking machine; said he would

like to get it patented, but had not the means, and could make a fortune out of it." Drawbaugh testifies as follows: "Question. A good many witnesses have testified that you were at various times talking of patenting your electric-speaking telephone invention; what is your recollection about that? Did you intend to patent it or not? Answer. Yes, sir; I intended to patent it. I had spoken to a number of persons to assist me. I would state to them that I would give them an interest in the invention for them to furnish the money to have it patented. Question. Why did you not patent it with your own money? Answer. I didn't have any money. Question. At how early a time did you have the intention of patenting it? Answer. I could hardly say how early. I spoke to persons even at an early time. I spoke to Christian Eberly. It may have been prior to 1870, I spoke to Frank Lee. I spoke to them about taking an interest. They were among the earliest. I can't remember all the persons, as I had spoken to a great many. Lee is not a witness, having died in 1872."

Christian Eberly locates the time as between 1867 and 1870. He had been a partner with Drawbaugh in a number of inventions, and was a capitalist. He was asked "When Mr. Drawbaugh showed you his talking machine, state whether he proposed to you to go into partnership with him, and furnish the money for that also, as you had before that time on the other inventions?" He answered: "Not altogether; he intimated that he would take me in. I don't recollect as I said anything, or what I said." The witness was often in Drawbaugh's shop subsequently, in 1871, 1872 and 1873, but mentions no other proposition.

The only other persons Drawbaugh specifies as having been applied to by him are Capt. Moore, Henry Bayler, and Simon Oyster. Oyster was not called as a witness. Capt. Moore was examined as a witness for the defendants, and his testimony is significant. He was the principal of the Soldier's Orphan School, an institution in the vicinity of Eberly's Mills, and was the secretary and treasurer of the Axle Company, a concern that in part occupied Drawbaugh's shop in 1875 and 1876. He testifies that about May, 1875, Drawbaugh showed him a talking machine; said he was unable to patent it himself, and desired witness to "go in with him and get a patent." He states that he told Drawbaugh he didn't want to go into any new

inventions, but that it would be a fortune to any person bringing it out, if it could be put to practical use. He identifies "Exhibit B" as the only machine shown him at that time by Drawbaugh.

Although he and Drawbaugh maintained intimate business relations for a year after that time, the subject seems never to have been referred to again. Mr. Moore was an intelligent capitalist. It is strange that Drawbaugh should have shown him "Exhibit B," one half of the crude instrument of 1867-1869, if the perfect instruments "E" and "D" were in existence; and more strange that the subject was never mentioned again between them, or that no attempt was made to speak through any machine if they had any faith in the value of the invention.

Mr. Bayler, the other witness, carried on lumbering and a saw mill from 1873 to 1877, in the vicinity of Milltown, and employed Drawbaugh frequently to repair machinery. He testifies that in June, 1873, Drawbaugh showed him the talking machine, and he said to Drawbaugh, "Why, Dan, that is virtually a talking telegraph," and advised him to take out a patent for it; to which Drawbaugh replied: "If I had the means, I would. If you'll advance me the means to procure a patent, I'll give you a half interest." The witness continues: "Generally on him meeting me he would urge it, urge me to take an interest by furnishing him the means to take out a patent." He also identifies Exhibits "F" and "B" as the instruments shown him by Drawbaugh. But his books show that during all the time from April, 1873, to May, 1876, he owed Drawbaugh more than the fees necessary for procuring a patent.

The defendants produce other witnesses to prove that from 1870 to 1879, Drawbaugh was showing his telephone, adverting to his poverty, and trying to induce somebody to assist him. Mr. Herr may be cited as an illustration. He testified that in 1870 or 1871, Drawbaugh wanted money to get a caveat to secure his invention, and told the witness if he would help him, or procure any person to assist him, he would give him a half interest. Without adverting further to the testimony on this subject, it is sufficient to say, in view of the fact that there never was a time from 1867 to 1880, when Drawbaugh did not have the money to caveat and patent his invention or the means of borrowing it, that the only legitimate effect of

such testimony is to discredit the whole defence by exciting the suspicion that it is bolstered up by exaggerated and unreliable testimony.

It will hereafter be shown that among the men with whom Drawbaugh maintained business and friendly relations during this period, there were many of intelligence and means. Some of them may have distrusted his judgment, and regarded him as a visionary. Some of them may have been indifferent or timid. But it is incredible that when only a trifling sum was required for a half interest in the invention, none of them could be sufficiently impressed with its merit or financial value, to investigate it seriously as a speculation or an investment. He induced persons to invest in faucet inventions, and in his magnetic clock ; and it cannot be true that he could find no one to entertain the talking machine, which, according to the common rumor of the neighborhood, was to supersede the telegraph, and, in the words of one of the witnesses, "make Drawbaugh the richest man in the Cumberland Valley."

It was very natural that a hard headed old farmer like William Darr, on being told by Drawbaugh that he had a machine by which he could talk across the Atlantic Ocean should advise him to "try it first in talking across the Yellow Breeches Creek," but it is beyond comprehension or belief that none of the capitalists or speculators about him could be induced to seriously consider it, if it was an operative device.

Where a witness falsifies a fact in respect to which he cannot be presumed liable to mistake, Courts are bound "upon principles of law, morality, and justice to apply the maxim *falsus in uno falsus in omnibus*." (The Trindad, 7 Wheat. 283.) Drawbaugh could not be mistaken in asserting that it was his poverty which prevented him from caveating or patenting his invention. He was not led to the assertion inadvertently. Those with whom he is associated in the defence understood fully, and so did he, that the fact that a professional inventor and patentee did not go to the Patent Office to secure an invention like the telephone for ten years after it had been completed and demonstrated, was almost conclusive against the theory that he had made the invention ; and that unless this presumption could be parried, no Court would credit his story. The theory of constraining poverty was therefore formulated in the

answer, elaborately fortified by witnesses, and testified to by Drawbaugh. It is overthrown by a few plain, indisputable facts, and Drawbaugh's veracity falls with it.

The defence must rest upon the testimony of the witnesses who corroborate Drawbaugh. The case made by these witnesses is sufficiently formidable to overcome the legal presumption of the validity of the complainants' patents. It is met by the complainant with rebutting evidence direct and circumstantial, showing the intrinsic improbability of the theory that Drawbaugh was the inventor of the telephone, and showing his conduct or declarations inconsistent with any hypothesis that he was more than an unsuccessful experimenter with the invention. Many witnesses have also been produced by the complainant to attack the credibility and reliability of the testimony of the defendants' witnesses. Of necessity the testimony of most of the defendants' witnesses can only be attacked by showing that the witnesses are mistaken as to the time when they saw Drawbaugh's talking machine, or as to what they really saw on the occasions they refer to.

The way in which the testimony of Uriah P. Nichols is met will illustrate the general tenor of such testimony. Mr. Nichols was one of the most intelligent and trustworthy of the defendants' witnesses, a farmer and machinist, who testified that on the eighteenth day of January, 1875, he visited Drawbaugh's shop on business, saw two instruments, which he identified as Exhibits "B" and "A," and he described their mode of operation as stated to him by Drawbaugh at the time. He says he listened at one instrument while a boy spoke into another two hundred feet away, connected by wires, and heard the boy say: "Is it you, father, speaking?" The complainant produces nine witnesses to show that the occasion could not have been prior to February, 1878. The witness fixes the date by a purchase of lime made by him on the visit, and states that he went to Drawbaugh's to see an electric clock of which he had recently read a description in a newspaper, and soon after the visit told Mr. Maish and others about the telephone he had seen at Drawbaugh's.

The complainant proves that the newspaper article was not published until February, 1878; that when the witness told Mr. Maish of the telephone at Drawbaugh's, the latter, who was then a member

of Congress, remembered the occasion, knew all about Bell's telephone at the time, and had used it in Washington. Mr. Maish states that, as Drawbaugh was one of his constituents, he would have been deeply impressed by the conversation if he had understood Drawbaugh claimed to be the inventor. Without attempting to particularize the rest of the testimony for the complainant upon this issue, it suffices to say that several other witnesses were introduced to show that the lime was not purchased by Nichols before 1876. Much testimony is given by complainant upon collateral issues of a similar character.

One of these issues relates to the time when Thomas Draper ordered a hydraulic ram of Drawbaugh. Mr. Draper was an important witness for the defendants. He testified that he went with Mr. Kissinger, a tenant of his, to Drawbaugh's shop in May or the early summer of 1874, for the purpose of ordering of Drawbaugh a hydraulic ram to be used upon the farm Kissinger had leased of him in April, and that he was never at Drawbaugh's on any other occasion. He identified Exhibit "C" positively, and Exhibit "I" less positively, as the instruments used and through which he listened while Drawbaugh talked.

The complainant proved that the hydraulic ram was not put to use until the fall of 1878, and undertook to locate the date of Draper's visit approximately by that fact. Seventy-five witnesses were introduced by the respective parties upon this collateral issue. These illustrations show how hopeless a task it would be to review the testimony satisfactorily or analyze it minutely. Five hundred witnesses have been examined by the parties upon the main question and the collateral issues, and their testimony is in a printed record of over six thousand pages. If it were practicable to do so, it would not be profitable, because a microscopic view of the controversy would be inadequate and misleading.

In cases where such a chaos of oral testimony exists, it is usually found that the judgment is convinced by a few leading facts and *indicia*, outlined so clearly that they cannot be obscured by prevarication or the aberrations of memory. Such facts and *indicia* are found here, and they are so persuasive and cogent that the testimony of a myriad of witnesses cannot prevail against them.

The first group of facts of this nature are those which bear upon the capacity and character of Drawbaugh as an inventor, and tend to show that it is not only highly improbable, but almost impossible, that he could have been the author of the telephone.

In the summer of 1878, he composed a biography of himself for publication in the history of Cumberland County, which presents a graphic picture of the inventor and of the man. He commences by describing himself as "born in the quiet, secluded village of Milltown, three miles from Harrisburg," and as "one of the greatest inventive geniuses of this age, who has spent the greater part of an active life conceiving and producing, as the result of the conceptions of an unusually fertile brain, a score of useful, ingenious machines, and devices." "It appears," he says, "by examining a list of his inventions that the manufacturing interests of the place in his boyhood days gave direction to his thoughts and incentive to his actions." He proceeds to enumerate a list of his inventions as follows: "His first invention was an automatic sawing machine; then a number of machines used in wagon making; then a machine for boring spoke tenets; then a machine for sawing tenets; a barrel stave jointing machine, patented in 1851. This machine was pretty generally introduced, and its merits appreciated; an automatic grinding machine was next invented to meet a demand created by the introduction of the jointer; then followed several machines for making stave headings and shingles, all of which were patented in 1855; after which machines for rounding, heading, crozing, dressing and finishing outside of barrels were invented; these were again followed by device for running mill-stones; one for dressing mill-stones; a device for elevating grain in mills. He then invented and had patented four improvements in nail plate feeding; next a tack machine, and a new design in tacks. Photography next engaged his attention. He fitted himself for action in this field by manufacturing his own camera, ground and fitted acromatic lenses for camera, prepared the necessary chemicals, and improved the process for enlarging pictures. Next electricity and electrical machinery attracted his attention, and an electric machine was produced throwing out of consideration the galvanic battery and electric pile; then a machine for alphabetical telegraphing; then the justly celebrated electric clock, and the ma-

chinery necessary for its construction; and several kinds of telephones, one of which is operated by battery, and another by induction." He concludes as follows: "It will be seen from the foregoing that Mr. Drawbaugh has penetrated vast fields in search of information, and with what success we leave it to the readers to determine. We are proud to own Mr. D. as a citizen of our township, and deem him worthy of a position at the head of the list of our prominent men, and are happy to accord him that position." This portrait, drawn by himself, depicts without the aid of extrinsic evidence, the ignorance and vanity of the man, and incongruous and fantastic assortment of his inventive projects. It suggests, also, the character of a charlatan.

That he was a skilful and ingenious mechanic is undoubtedly true. Invention was his hobby and his vocation, but that he was an inventor in the large sense is disproved by the nature and results of his work. Every patent that he obtained was for some improvement on existing devices which involved mechanical skill rather than any high degree of inventive faculty. This is shown to some extent on the face of his patents, the list of which is as follows:—

Nov. 11, 1851, "for improvement in stave jointing machines;" May 22, 1855, "for stave machines;" April 28, 1864, "for improvement in mill-stones;" May 12, 1863, "for improved machine for leveling the faces of mill-stones;" Dec. 12, 1865, "for improvement in nail plate feeders;" Nov. 20, 1866, "for improvement in faucets;" Nov. 19, 1867, "for improvement in nail feeding device."

His own testimony given in an interference proceeding in the Patent Office in 1879, shows that none of his inventions were sufficiently meritorious to prosper vigorously. That proceeding involved a question of priority of invention between himself and one Hauck, respecting an improvement in a faucet. He had filed his application for a patent in January, 1879, and undertook to carry back the date of his invention to 1869. The scope and range of his inventive faculty became a subject of inquiry. He there testified that he had made "he might say fifty inventions, and had patented over a dozen." He was cross-examined respecting certain inventions to show that they did not work satisfactorily. He was then asked: "Since 1866 what machines have you conceived and perfected that have worked

satisfactorily?" He answered, "To the best of my knowledge I think they all have. The nail machine gave satisfaction. I had it running in the works, but the nailers drove it out. The tram and red staff was a good machine, and adopted by a number of millers. The magnetic clock I consider a good thing, but I am not through with experiments on it yet. I believe this last faucet to be a good thing."

If his nail machine had induced the workmen to drive it out of the shop, it ought to have commended itself to the capitalist. His magnetic clock had not been patented at this time, though it had been for a time the wonder and admiration of the community in which he lived; but when it was patented, in 1879, it was as a "new article of manufacture," consisting of a galvanic battery for electrical clocks, which had two old elements united instead of being disconnected as in former devices. The history of this clock shows clearly that it was of no practical merit; and the clock had been substantially described in Tomlinson's Encyclopedia, and he had the book before he made his alleged invention. His other electrical devices he never patented, and in his testimony in the interference proceedings he did not refer to them as among his perfected and successful inventions. One of these was his magneto-electric machine for short line telegraphing and fire alarms, sometimes mentioned as his "magneto key." It was not a new device, and the proofs show that it was a failure.

When the speaking telephone was first introduced to the attention of the scientific public, it was pronounced by one of the most eminent electricians of the day "a result of transcendent scientific interest," and "the greatest by far of all the marvels of the electric telegraph." The inventions attributed to Drawbaugh include not only the conception of the principle of the unbroken, undulatory electric current, and of the delicate and complex instrumentalities essential to its efficient application in transmitting and reproducing articulate speech, but also of many other devices involving a nice adjustment of forces, and requiring sensitive mechanism. These were inventions of a peculiarly scientific order, which would seem to demand a special conversance with the principles of acoustics and electricity. Besides making the cardinal discovery of the theory of the unbroken, undulatory current, Drawbaugh is assumed to have

perfected a brilliant and extraordinary series of original discoveries, for which, to use the words of Mr. Benjamin, "there is no parallel instance in the whole history of invention." Mr. Benjamin, referring to the microphone which was introduced to the public in 1878 by Mr. Blake, but which is one of the instruments asserted to have been invented by Drawbaugh at an earlier date, says: "It was looked upon as a great and original discovery."

It was said by Chief Justice Taney (*O'Reilly v. Morse*, 15 How., 111), speaking of the invention of the telegraph: "No invention can possibly be made consisting of a combination of different elements of power without a thorough knowledge of the property of each and the mode in which they operate on each other. For no man ever made such an invention without having first obtained this information, unless it was discovered by some fortunate accident." None of Drawbaugh's alleged discoveries were made by accident. His statement is that starting with the belief that speech could be transmitted by electricity he made first one contrivance and then another, gradually obviating difficulties and making advances experimentally, until he finally perfected the several inventions.

In view of Bell's special equipment for investigation and experiment in electrical and acoustic science, it would not seem strange that his persistent efforts to effect the electrical transmission of speech were eventually successful, were it not that others as intelligent, as well equipped, as ingenious and as persevering as he, had devoted years to the same object in vain. He had the assistance of Mr. Watson, an expert in electricity and a skilled workman in electrical mechanism, in constructing the apparatus employed in his experiments, and who also aided him in his experiments. He had demonstrated his inventive proficiency by inventions in telegraphy, for which patents were granted to him. And yet, had it not been for an accidental discovery made by him in June, 1875, and which would probably have escaped one whose trained faculties were not centred on a careful study of the phenomena, he might have failed.

Drawbaugh, on the other hand, was not only untutored, but he was isolated by his associations and occupations from contact with men of advanced science; he had narrow opportunities for instruction, and few incentives for profound research. Among the multi-

tude of his inventive conceptions was one that a talking machine was a possibility. According to the testimony of Lory, a witness for defendants, before Drawbaugh began his practical experiments, he exhibited a sketch of a machine that he was about to make that would talk a distance of twenty miles, and work something like a telegraph. If this is true, he commenced on his telephone as the architect plans a building, or the engineer makes a draught of his structure. His own testimony shows that he did not attempt to qualify himself for electrical inventions by any systematic study after he began experimenting with his talking machine. Although he had undoubtedly acquired considerable desultory information about electricity, and especially about the mode of operation and detail of construction of electrical mechanism, it is obvious that when he commenced with his talking machine he was a tyro in electrical science, essaying the most difficult work of the electrician. It is almost incredible that the subtle intellectual discoveries, which were a closed book to the ablest electrician, could have been reached by a smatterer in science, or by any series of empirical experiments.

As has been remarked, he seems to have discovered nothing accidentally ; yet, from the beginning to the end of his narrative, there is nothing to indicate the conceptive origin or the mental growth of the alleged invention. He presents a number of devices in the chronological order of their production, and testifies that he made one and then another and another, as experiments led him to modifications and improvements. He cannot describe what receiver or other apparatus he used with his first transmitter, and testifies : "I had a number of crude apparatuses, but can't remember exactly the shape of any of them. I had membranes stretched over hoops, — over a hoop, — I remember that ; and I had electro magnets, and the arrangement was varied ; I don't remember exactly the arrangement."

He testifies that when he used the cup machine he used it in a continuous electric circuit, and thinks he used it as a receiver with Exhibit "B" as a transmitter. He states that he succeeded in transmitting speech with these two instruments, and, of course, he could only have done this by employing the unbroken undulatory current of electricity. He cannot state how he conceived the initial idea of the undulatory current and the continuous circuit, or subsequently the

theory of any of the remarkable devices which he produces. His answers to questions intended to elicit such information may be illustrated by giving one of them: "I don't remember how I came to it; I had been experimenting in that direction; I don't remember of getting at it by accident either; I don't remember of any one telling me of it; I don't suppose any one told me." He produces sketches, or models, or originals of instruments, which he says he made from time to time; he states that they were used to talk through on various occasions; and from these outlines of accomplished facts, leaves the history of his inventions to be filled out by inference and conjecture. An inventor can hardly forget the process of thought by which a great intellectual conception germinates and matures into the consummate achievement; but Drawbaugh's memory is a blank. If the untutored mechanic educated himself into an accomplished electrician by his own experiments and observations, the incidents and phenomena which revealed new discoveries and illumined the way for new advances would be indelibly impressed upon his mind. It seems a little short of the miraculous that a man of his capacity and equipment should have produced these inventions at all; more marvelous still that he should have produced them without any intellectual perception of his discoveries.

Another group of important facts, which are satisfactorily shown by the proofs, are those which indicate Drawbaugh's own knowledge that he was not an original inventor of the telephone. Reference has been made to some of the evidence bearing upon his neglect to patent or caveat his invention, in discussing the question of his credibility as a witness.

If no honest and reasonable explanation can be given for his conduct, the inference is very strong that he knew he did not have a practical telephone to patent. He may have had a talking machine, which was well calculated to excite the curiosity of the community in which he lived; he may have indulged in expectations that in time he could succeed in making a practical speaking telephone and reap fame and profit from it; but his conduct is almost decisive against the supposition that he had even deluded himself with the belief that he had produced anything sufficiently practical and valuable to patent. He never attempted to exhibit it outside of his

own shop to prove that it would transmit speech at a distance of even a quarter of a mile. The proofs show that during all the years, from 1867 to 1878, he did not attempt to avail himself of opportunities for demonstrating his invention and bringing it to the notice of friends who were peculiarly qualified to appreciate, and were favorably circumstanced to assist him. One of these persons was Mr. Kiefer, who resided at Harrisburg, from 1863 to 1881, and during that period had charge of the telegraphs of the Pennsylvania Railroad Company, and was a member of a firm whose business was the manufacturing of fine electrical machinery.

In 1873 he put up a fire-alarm system for that city. Drawbaugh made his acquaintance in 1874 or 1875, and brought his magnetic fire alarm to Mr. Kiefer for examination. At another time, he brought the works of his electric clock. He visited Mr. Kiefer on various occasions, obtained small supplies from him, and habitually conversed with him upon the subject of his electrical contrivances. The period of these visits begins just about the time when, according to the theory of the defendants, Drawbaugh had constructed Exhibits "E" and "D," and the invention was complete. He never mentioned to Mr. Kiefer the fact that he had experimented with a telephone. Mr. Wilson was superintendent of telegraphs for the Northern Central Railway Company, at Harrisburg, from 1864 to 1875. He was also mayor of Harrisburg. The company had an electrical workshop and supply establishment there for Mr. Wilson's department between 1871 and 1875. During this time Drawbaugh often came to the supply shop, and talked with Mr. Wilson about electrical experiments, and obtained parts of batteries, coils, magnets and other electrical material which the company had cast aside. He brought Mr. Wilson his electric clock and his magneto-electric key, and tried his machine for short-line telegraphing at Mr. Wilson's office. He talked with him frequently about his inventions; but he never mentioned the telephone. His relations with David A. Houck were such that the latter procured him an opportunity to test his magneto key at the telegraph office of the railroad company at Mechanicsburg. Mr. Stees was the superintendent of a car company at Harrisburg, having shops in different parts of the city connected by telegraph lines. He was the first person to employ Bell's

telephone on these lines, when they were introduced into Harrisburg late in 1877 or early in 1878. He was a friend of Drawbaugh, and Drawbaugh would naturally have applied to him if he wanted to test his telephone publicly and practically.

Isaac Lloyd was a school teacher and an alderman at Harrisburg; had known Drawbaugh long; was accustomed to visit his shop from time to time; saw many of Drawbaugh's inventions; was present on one occasion when Drawbaugh experimented with his magneto device for telegraphing at Mr. Wilson's telegraph office. Drawbaugh visited him frequently, and they were accustomed to converse about Drawbaugh's inventions. Drawbaugh showed him his dial telegraph, his electric fire alarm apparatus, and numerous other inventions. Witness assisted him about the electric clock. He was an owner of patents and a friend to whom Drawbaugh applied for loans, and was interested in mechanical subjects generally. The only mention ever made to him by Drawbaugh about a telephone was in 1878, when Drawbaugh told him he was experimenting with a telephone. From 1867, to July 1873, Drawbaugh was intimately connected with the persons composing the Drawbaugh Manufacturing Company, which was engaged in manufacturing devices under Drawbaugh's patents. He was a stockholder and the master mechanic of this company. Among the officers and stockholders were many men of capital and enterprise. There came a time when the managers of the company wanted Drawbaugh to suggest new devices for the company to manufacture. He never suggested the telephone nor attempted to induce the managers of that company to investigate or exhibit his talking machine. A number of the managers and employees of this concern testify that they never heard of the existence of the talking machine during the life of the company. Without attempting to refer to other testimony to the same general effect, what has already been referred to, shows that if Drawbaugh had seriously desired to bring his talking machine into public notice and secure the fruits of his invention, he had ample opportunity to do so. Who can doubt that if he had a practical telephone to exhibit, he would have selected just such men as Kiefer, Wilson, and the others to demonstrate it to them, and enlist them to demonstrate its utility and value to the public?

Such an invention was of a kind well calculated to excite public interest and to impress practical men with a quick appreciation of its commercial importance and its pecuniary value. It was so sufficiently perfected, according to the theory of the defence, that a patent could have been obtained prior to 1870, to secure the application of the principle and to compel every subsequent inventor to pay tribute to the discoverer of a new art. For years it was mechanically perfect, and its efficiency and importance as a great factor in human intercourse could have been demonstrated to the public without appreciable inconvenience or expense. Drawbaugh fully appreciated its importance and value. He had the means to patent it himself, and friends to assist him in introducing it into public use. He had the talent to induce others to invest in his inventions. No explanation is possible why, under such circumstances, his efforts should have left no mark upon the annals of inventive progress, and given no evidence of life beyond the idle curiosity his talking machine excited in the circle of his admirers during all these years. His conduct is more persuasive to show that he did not have a practical, operative telephone, than the testimony of a multitude of witnesses who may have seen and heard talking machines at his shop during this period. But the complainant has given evidence of his declarations, made by him, before he had any interest to pervert the truth, which afford a reasonable explanation of his conduct, and go far to explain how the testimony of the corroborative witnesses may be reconciled with the truth.

In 1874-6 Drawbaugh issued a business card, advertising himself as "Inventor, designer, and solicitor of patents." On the back of this card is printed a list of his inventions, as follows: "Stave heading and shingle cutter; barrel machinery; stave jointing machine; tram and red staff for levelling face of mill stones; rine and driver for running mill stone; nail machinery for feeding nail plates; pumps, rotary and others; hydraulic ram; the Drawbaugh rotary measuring faucet; carpet rag looper; electric clock and magneto-electric machine for short-line telegraphing and fire alarm, and propelling electric clocks." He takes pains to say of this magneto machine on his card that it "can be applied to any form of electric movement, and dispenses with a galvanic battery." He had ob-

tained patents for some of these inventions, but had not for others. He was then experimenting with his electric clock, and with his magneto-machine for short-line telegraphing, fire alarms, etc., and included them in the list of his inventions. The omission to mention the most important one of all his inventions, one respecting which, according to his present testimony, there had not been a week from the time he made his first cup machine that he had not been engaged with it, one which was complete before his electric clock was complete, is a significant statement by implication that he had no such invention to advertise.

It is to be remembered that when he chronicled his achievements in the autobiographical sketch of 1878, the Bell telephone had been introduced into commercial use at Harrisburg, three miles from Drawbaugh's shop, and the local newspapers had been full of the subject. The cursory allusion in that autobiography to "several kinds of telephones," is in striking contrast with the elaborate description of the electric clock, and wholly inconsistent with the theory that he deemed himself to be the originator of the telephone which, at that particular time, was a topic of universal interest.

In his testimony given in 1879, in the interference proceeding with Hauck, although he did not include the talking machine in the category of his successful inventions in the course of his testimony, he produced a sketch of his faucet, and stated that he made it "about 1874 to 1876, when I was experimenting on telephones or phonographs." He represented himself not as an inventor of that which he is now claimed to have perfected, but as an experimenter with a "telephone or phonograph." It is instructive to read this statement in juxtaposition with a statement made by him to Mr. Matthews in the preceding year. Mr. Matthews was the managing editor of the *Baltimore American*, and in April, 1878, made a visit to Drawbaugh at his shop to see Drawbaugh's magnetic clock, in consequence of information received from a correspondent. He was a careful observer, who went there obviously for the purpose of writing an article for his paper. That his memory is unusually retentive and accurate, and that he is a careful and conscientious man, is apparent from a letter written by him in December, 1883, after the proofs in the case had been closed, and in which he manifests a desire to correct certain

errors of detail in his deposition. Upon that visit his attention was chiefly directed to the clock, but he examined Drawbaugh's other inventions, and conversed with him about them; and, among other things, conversed about the telephone. Drawbaugh's statement to him on that occasion was, that he had invented apparatus to send messages by means of an alphabet founded upon difference of sounds. He did not profess to be the inventor of the speaking telephone, or assert that he had ever transmitted speech successfully with his apparatus. He said that the idea of transmitting sounds in this manner was not new, and that he had read of it some years before in a publication translated from the French; and he denied Bell's right to claim the invention of the telephone, because of that publication.

In the article founded on that interview which Mr. Matthews subsequently wrote for publication in the *Baltimore American*, he adverts to the several useful, agricultural, and mechanical devices patented by Drawbaugh, and adds: "It may be mentioned that Mr. Drawbaugh constructed a rude telephone long before Mr. Edison loomed up as the 'boss' inventor. He never expected to send articulate sounds over a magnetized wire, but he believed that an alphabet could be arranged after the manner of the musical scale, and that messages could be transmitted and understood by the variations of tone and pitch. This unlettered mechanic came very near anticipating Edison and Bell in the invention of the telephone, and nothing but his poverty prevented him from conducting his experiments to a successful issue."

His advertising card, his testimony before the Patent Office, his autobiography, and his statement to Matthews, authenticated in writing, were all made when he had no pecuniary interest to color the facts, and upon occasions when he was anxious to present himself in the most favorable light as an inventor; and they were all made after his talking machine, according to the theory of the defendants, was a perfect invention and known to be such by many of his friends and neighbors.

These are declarations evidenced in writing, and one of them made under oath, which point in but one direction. They are consistent with his conduct. They show that he understood himself to be an

experimenter with telephones or phonographs, but not the inventor of the speaking telephone.

The complainant has supplemented this evidence by the testimony of other substantial witnesses who had favorable opportunities to know what Drawbaugh had invented, and who describe what they saw and did not see at his shop, and narrate what he said about his talking machines on various occasions. This testimony indicates that, at as late a period as in 1878-9, Drawbaugh was an experimenter, but not the author of the parent invention, nor one who had perfected any valuable improvement upon it; and is in substantial accord with his statement to Mr. Matthews and his testimony in the interference proceedings. What gives point and force to this testimony and parries the ordinary objections to the reliability of verbal declarations, is that these witnesses are persons who would have been forcibly impressed, because of their interest in the particular subject, by any assertion by Drawbaugh that he was an inventor of the telephone. During the time in question Drawbaugh had friendly relations with the newspapers of the vicinity; his friends were frequently communicating laudatory notices of his mechanical and inventive efforts to the press; and he himself visited one of the newspaper offices in the spring of 1878, to show a telephone he had made. These newspapers had published articles about the Bell telephone; but up to the spring of 1878, while many notices had been published in them about his electric clock and other inventions, describing him as a man of extraordinary genius, there had been no mention of the telephone; and when, in the spring of 1878, the subject was mentioned, he was referred to as one who was "inventing a telephone on a different plan from that now occupying the attention of the scientists," and as about completing "the new telephone he is now constructing."

In this connection it is to be noted that soon after telephones were introduced in Harrisburg, late in 1877, or early in 1878, Drawbaugh visited the offices where they were used, examined the inside of the instruments, and borrowed one to take home, which he kept for several days; and the instrument which he borrowed bears a close resemblance in appearance to Exhibit "A," which it is asserted he had made in 1873 or 1874.

No extended reference will be made to the testimony of other witnesses, such as Mr. Weaver and Mr. Grissinger, showing declarations of Drawbaugh made after the Bell telephone was in commercial use to the effect that, although he had experimented on the telephone years before Bell, he had obtained no satisfactory results.

It remains to consider what effect is to be given to the testimony of the multitude of witnesses who have been produced to substantiate the defense. Disregarding the testimony which is merely hearsay, and therefore incompetent as evidence of the main fact, the testimony of many other witnesses is overthrown by the palpable improbability of their statements, or by the contradictions between their statements and those of other witnesses for the defendants upon substantiative points, or by successful attacks upon their accuracy in the rebutting testimony of the complainant.

There still remains a formidable number of witnesses who testify to seeing or using Drawbaugh's talking machine, and some of whom identify particular exhibits as the instruments which they saw or tried.

No doubt is entertained that Drawbaugh was experimenting at an early period with telephones or phonographs. He knew about the phonograph or phonautograph of Scott as early as in 1863. The membrane diaphragm excited by sonorous waves, and the mechanism of the phonograph were not novelties, and, among the diversity of inventive possibilities had probably attracted his interest. Prior to the issue of Bell's patent, Dr. Van DeWeyde had made public experiments with the Reis telephone at the City of New York, and others had made like experiments elsewhere. In May, 1869, a full description of the instrument and of the experiments was published in the newspaper, "*The Manufacturer and Builder*," treating it as a highly interesting curiosity, which contained the germ of great practical purposes. Whether other newspapers noticed the experiments or not is not shown, nor is it shown that Drawbaugh saw the article in "*The Manufacturer and Builder*." It would be difficult to prove the circumstances if he did see it. Some such publication probably stimulated him to experiment. If he made a sketch of the mechanism at the start the material for it was at hand. As is stated by Mr. Benjamin, it has been asserted of the Reis instrument, that certain sounds of the

human voice can be transmitted by it, but in truth these are merely fragmentary reproductions of vocal sounds, and the transmission of articulate speech could not be effected because it was constructed on the make and break principle, instead of on that of the undulatory unbroken current.

It is not strange to any reader of the autobiography that Drawbaugh should have taken up the telephone. That he and those about him should have treated it as a talking machine is entirely natural. That his talking machine as late as in 1876 bore a striking resemblance to the Reis telephone is shown by Mr. Shapley's testimony, a witness who noticed the resemblance and loaned Drawbaugh a copy of the *Scientific American* describing it.

There is enough here to explain Drawbaugh's declarations to his neighbors about the talking machine he was inventing, and to excite the curiosity of the community. A careful reading of the proofs renders it easy of belief that the witnesses who testify about casual visits to his shop, which occurred many years before their testimony was delivered, and to cursory tests of his instruments on those occasions, have confused the fragmentary and incoherent articulation of such an apparatus with the hearing of distinct words and sentences. When witnesses undertake (as many of them do), to give the exact words or sentence heard in the instrument five or ten years before, when their attention was not called to the subject afterwards, no hesitation is felt in rejecting such statements as utterly incredible. It may be charitably inferred that such a witness has confused his recollection with more recent impressions. As will hereafter be shown, the proofs demonstrate that most of the witnesses who testify to having heard distinctly and coherently through the talking machine, all those who indicate the Exhibits "B," "F," and "C" as the instruments, are mistaken if they are truthful. If Drawbaugh was a charlatan, he may have assisted in deluding them; and the proofs show, that between 1872 and 1874, a string telephone was in his brother's shop, in the village. The fact that he never attempted to exhibit his machine outside of his shop where it could be used between points some considerable distance apart, and where its real capacity could be readily observed, is significant in this connection.

The more important testimony is that by which it is sought to

identify the several exhibits, and show their existence at times consistent with the theory of the natural evolution of the invention. The identification of particular exhibits as seen by the witnesses among the various objects of curiosity at Drawbaugh's shop several years before they testify, is necessarily unreliable when it is attempted by observers who had no knowledge of the mode of operation or of the internal organization of the instruments. Such witnesses could not appreciate what they saw even if they examined the instruments. Most of the witnesses belong to this class. Indeed, the greater proportion of them do not profess to identify the exhibits positively. Some are more certain than others that particular exhibits are the instruments they saw. Exhibits "F," "B," and "C," are fragmentary remains of instruments, and their value depends upon Drawbaugh's description of the operative parts that no longer exist. Scores of witnesses testify to seeing the tumbler device resembling Exhibit "F," and the tin can device resembling Exhibit "B," but the identification of the other exhibits prior to the date of Bell's patent is comparatively feeble.

The appearance of Exhibits "F," "B," and "C" is sufficiently peculiar and distinctive to impress the memory of those who saw them. On the other hand, the other exhibits are not of this character, and all that ordinarily the witnesses can safely say of them is, that five years or more before testifying they think they saw or used a small walnut box externally resembling "I," or "A," or "E," or "D."

It may be said generally of all the testimony of the witnesses who attempt to identify exhibits, that it is mainly valuable when it proceeds from those who used the instruments which they think they remember and obtained results. They must remember the results obtained much better than the minor differences of appearance presented by the instruments. Granting that Exhibits "F," "B" and "C" would be likely to be remembered, what shall be said of the value of the testimony of scores of witnesses who state that they tested these instruments, or saw others test them, and they articulated perfectly, when it appears by the most authentic test that these instruments were incapable of such articulation?

In March, 1882, after most of the proofs in the case had been taken, a test was made of the capacity of the exhibits to transmit

speech in the presence of the counsel and the experts for the respective parties. It is not accurate to say a test was made of the exhibits ; but reproductions of " F," " B," and " C," were made by Drawbaugh, and as rehabilitated by him, were used for the test. Whether these were honest reproductions, no one can tell ; but such as they were, they were experimented with by Drawbaugh before they were subjected to the test. Whatever else that test demonstrated, it proved that articulate speech could not have been practically communicated through Exhibits " F," " B," and " C," at Drawbaugh's shop under similar conditions ; and that only fragmentary or incoherent speech could be occasionally and exceptionally rendered by the reproduced instruments which had been experimented with privately before the public test. The proofs show that all along to 1878 Drawbaugh exhibited his earlier instruments, " F" and " B," to spectators and used them as his talking machine, sometimes showing or using both together, and sometimes one of them. The testimony of the defendant's witnesses, — Springer, Moore, Musser, and Bayler, is pertinent upon this point, and has been referred to. How is it to be explained that he used these crude instruments in 1875 and 1876, as his talking machine, if he had the better instruments, especially such instruments as " E" and " D"? But in view of the fact now shown that these earlier exhibits are incapable of satisfactory articulation, what confidence can be placed in the rest of the testimony produced to identify exhibits? If the witnesses are mistaken in identifying these very characteristic instruments, and in recalling the results obtained through them, little reliance can be placed upon the identification of the other instruments, or upon the statement of the results which the witnesses think were obtained through them. If these witnesses are mistaken in the dates which they fix for the occasions they speak of, their testimony can be reconciled with all the probabilities of the case. And the reasonable explanation of their testimony is, that those witnesses who really saw or used the later exhibits, did so in 1876, 1877, 1878, and later, instead of on earlier occasions.

The proofs on both sides lead to the general conclusion that Drawbaugh was not an original inventor of the speaking telephone, but had been an experimenter without obtaining practical results until the introduction of the instruments into Harrisburg. It is very prob-

able that after reading in the *Scientific American*, loaned to him by Mr. Shapley in October, 1876, the article purporting to describe Bell's telephone, but which really describes better the Reis apparatus, he undertook to improve his old devices. At that time, or after he had examined the telephone instruments at Harrisburg, and carried one of them home to study, he may have altered the organization of his instrument, and made the intermediate exhibits between "F" and "D." If he exhibited them at his shop, and was able to transmit speech through them, this fact will account for the testimony of the witnesses who identify these exhibits, and may be mistaken as to the time they saw them. The real history of his talking machine is known only to himself, and it will not be profitable to conjecture when he made the advanced instruments which he claims to have made in February, 1875, and the later instruments.

It may be, that in discrediting his narrative, and rejecting the theory of the facts which rest upon it, the value of the corroborative testimony has been underestimated. However this may be; no doubt is entertained as to the conclusion which should be reached upon the proofs.

Succinctly stated, most favorably for the defendants, the case is this: One hundred witnesses, more or less, testify that on one or more occasions, which took place from five to ten years before, they think they saw this or that device used as a talking machine; they are ignorant of the principle and of the mechanical construction of the instruments, but they heard speech through them perfectly well, and through one set of instruments as well as the other. This case is met on the part of the complainants by proof that the instruments, which most of the witnesses think they saw and heard through, were incapable of being heard through in the manner described by them, and further that the man who knew all about the capacity of his instruments never attempted to use them in a manner which would demonstrate their efficiency and commercial value, but on the contrary for ten years after he could have patented them, and for five years after they were mechanically perfect, knowing all the time that a fortune awaited the patentee, and with no obstacles in his way, did not move, but calmly saw another obtain a patent and reap the fame and profit of the invention.

Without regard to other features of the case, it is sufficient to say that the defense is not established so as to remove a fair doubt of its truth, and such doubt is fatal.

The observation of an eminent commentator may be quoted as apposite to the case: "No form of judicial evidence is infallible, however strong in itself; the degree of assurance resulting from it amounts only to an indefinitely high degree of probability; and, perhaps, as many erroneous judgments have taken place on false or mistaken direct testimony, as on presumptive proof." Best's Ev. Sec. 468.

A decree is ordered for complainant.

